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Be tamping of diagnostic holes for NIF scaled experiments*, E. J. Hsieh, O. L. Landen and R. J. Wallace, Lawrence Livermore National Laboratory, University of California, Livermore, CA 94550

The hi-Z plasma created in hohlraums by the laser energy expands into diagnostic holes and causes attenuation of signal information. This time dependent decrease in signal (eg. x-ray flux) creates an apparent closure of the diagnostic holes. The problem can be corrected by tamping the hole with low-Z material, such as Be. The low-z plasma is transparent to x-ray and its presence impedes the expansion of the hi-Z plasma into the diagnostic hole.

From target fabrication standpoint, there is no practical method to coat the inside edge of an diagnostic hole with low-Z material on a hohlraum. Instead the hole is modified by gluing an Be coated Au washer over the hole. Since 1988, we have used this method on most NOVA experiments. To cover the inside edge of the washer as well as the flat surface, the sputtering coating process is utilized. The washers has to be coated twice, first from the front and then the back, in order to have sufficient Be coverage at the inside edge. The Be thickness is determined by the ablation rate which is proportional to beam energy and pulse length. Present Be thickness is approximately 35 microns and is sufficient to prevent hole closure for short pulse NOVA experiments (few nsec). The National Ignition Facility (NIF) will have higher beam energy with longer pulse length and require Be liner thickness of 70 microns. Based on current coating methods, more than 45 hours will be required to fabricate a set of washers. In view of this unacceptably long turn around time and cost, we are exploring alternative approaches. Coating Be on one side of the Au washer may be sufficient. Where the ablation rate is high, such as the flat area on a washer, the deposition rate is also high during coating. A pure Be foil without the internal Au washer may be useful although forming the Be foil to fit the contour of the hohlraum may be problematic. Low-Z CH polymers replacement for the Be tamper is also being considered. Preliminary results from this investigation including computer modeling and some experimental work will be reported.

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